

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
<input type="checkbox"/>	<input checked="" type="checkbox"/> The exact sample size ( <i>n</i> ) for each experimental group/condition, given as a discrete number and unit of measurement
<input type="checkbox"/>	<input checked="" type="checkbox"/> A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
<input type="checkbox"/>	<input checked="" type="checkbox"/> The statistical test(s) used AND whether they are one- or two-sided <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
<input type="checkbox"/>	<input checked="" type="checkbox"/> A description of all covariates tested
<input type="checkbox"/>	<input checked="" type="checkbox"/> A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
<input type="checkbox"/>	<input checked="" type="checkbox"/> A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
<input type="checkbox"/>	<input checked="" type="checkbox"/> For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i> ) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give <i>P</i> values as exact values whenever suitable.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/> For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
<input checked="" type="checkbox"/>	<input type="checkbox"/> For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
<input checked="" type="checkbox"/>	<input type="checkbox"/> Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i> ), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	Quantstudio™ Design & Analysis Software v1.52
Data analysis	Quantstudio™ Design & Analysis Software v1.52, GraphPad Prism 9

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

All data upon which conclusions are made are included in the manuscript or in the supplemental information file provided.

## Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

### Reporting on sex and gender

The findings are not limited to only one biologic sex. Biologic sex was not considered in the study design. Sex refers to the sex assigned at birth which in all cases was confirmed at autopsy by examination of internal and external organs. The requirement for patient consent for this project was waived by the IRB, and patient consent was not obtained. The study involved a total of 15 male decedents and 10 female decedents. The detection of vaccine in the heart was not associated with sex.

### Reporting on race, ethnicity, or other socially relevant groupings

Race was categorized as white, black, or unknown based on the medical record. Confounding variables regarding race were not controlled for due to the small sample size.

### Population characteristics

The vaccinated patients entailed 20 patients with a mean age of 64, a mean BMI of 26 and histories of coronary artery disease (33%), hypertension (78%), hyperlipidemia (72%), diabetes mellitus (33%), autoimmune disease (17%), and smoking (50%).

### Recruitment

The patients recruited all underwent autopsy performed at Massachusetts General Hospital between January 2021 and February 2022. Inclusion criteria were the ability to collect fresh tissue, a clear history of either vaccination or no vaccination, and a post-mortem interval  $\leq 60$  hours. Patients with a history of SARS-CoV-2 infection were excluded.

### Ethics oversight

Mass General Brigham IRB

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

## Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

### Sample size

Samples size was determined based on the number of autopsies that met the study criteria.

### Data exclusions

No data were excluded.

### Replication

All PCR-positive samples were confirmed by sequencing.

### Randomization

Samples were allocated into groups based on the presence or absence of vaccine detected by RT-PCR. The number samples positive for vaccine were small and covariates were not controlled.

### Blinding

The investigator performing the vaccine RT-PCR was blinded to the presence of myocardial injury and the macrophage counts.

## Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

## Materials &amp; experimental systems

n/a	Involved in the study
<input type="checkbox"/>	<input checked="" type="checkbox"/> Antibodies
<input checked="" type="checkbox"/>	<input type="checkbox"/> Eukaryotic cell lines
<input checked="" type="checkbox"/>	<input type="checkbox"/> Palaeontology and archaeology
<input checked="" type="checkbox"/>	<input type="checkbox"/> Animals and other organisms
<input type="checkbox"/>	<input checked="" type="checkbox"/> Clinical data
<input checked="" type="checkbox"/>	<input type="checkbox"/> Dual use research of concern
<input checked="" type="checkbox"/>	<input type="checkbox"/> Plants

## Methods

n/a	Involved in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> ChIP-seq
<input checked="" type="checkbox"/>	<input type="checkbox"/> Flow cytometry
<input checked="" type="checkbox"/>	<input type="checkbox"/> MRI-based neuroimaging

## Antibodies

Antibodies used	SARS-CoV-2 Spike Protein S1 rabbit Polyclonal Antibody, Invitrogen, Waltham, MA, catalogue # PA5-114528 Anti-CD68 Monoclonal Antibody, clone KP1, eBioscienceTM, Life Technologies, Carlsbad, CA, catalogue # 14-0688-82
Validation	Lung tissue from patients who died of severe COVID-19 was used as a positive control for both antibodies.

## Clinical data

Policy information about [clinical studies](#)

All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration	Not applicable, this was not a clinical trial.
Study protocol	Not applicable, this was not a clinical trial
Data collection	The patients recruited all underwent autopsy performed at Massachusetts General Hospital between January 2021 and February 2022. Clinical data was collected following the autopsies.
Outcomes	Study outcomes were the presence or absence of vaccine in the tissues as determined by RT-PCR.